

REMARKS

**[01]** Amendments

**[02]** New claims 15 and 16 relate to specific failure types mentioned in the specification.

**[03]** Obviousness of Claims 1-14

**[04]** Item 8 of the Office Action rejects Claims 1-14 for obviousness given a combination of U.S. Patent No. 7,107,191 to Stewart et al., “Stewart” herein, U.S. Patent No. 6,393,485 to Chao et al., “Chao” herein, and U.S. Patent No. 6,137,775 to Bartlett et al, “Bartlett” herein. These rejections are traversed.

**[05]** As the Office Action asserts, the present invention, Stewart, Chao, and Bartlett all relate to simulators. However, these simulators differ as to what is being simulated, what kinds of inputs are accepted, and what kinds of outputs are produced. The following table summarizes these differences.

Table: Differences Between Simulators of the Present Invention and Cited References

Disclosure	Object Simulated	Simulation inputs	Simulation outputs
Present specification	Cluster with failover	Pre-Failure Configuration; Failure event	Post-Failure Configuration
Stewart	Cluster	Configuration	Performance
Chao	Cluster with failover	Initial Configuration Reconfiguration event	Subsequent configuration
Bartlett	Phone network	Cut Span (failure event)	Restoration successful?

**[06]** The present invention relates to a simulator that simulates the reconfiguration that a cluster undergoes in response to a failure event. Inherently, the invention only applies to systems that are designed to respond to a failure by reconfiguring themselves. The inputs to the simulator are a pre-failure cluster configuration and a failure event; the output is a post-failure configuration of the cluster.

**[07]** Stewart relates to a simulator that predicts the performance of a cluster in a given configuration. Stewart does not disclose or require that the cluster can reconfigure itself in response to a

failure. The input to Stewart's simulator is a cluster configuration and the output is a performance rating. The simulator does not output a post-failure or any configuration other than the one being evaluated.

**[08]** Chao relates to a cluster simulator that accepts a pre-modified configuration and reconfiguration events as inputs and outputs a modified configuration. Chao does not disclose that Chao's simulator accepts virtual failure events as inputs nor does it simulate the response of a cluster to a real failure event.

**[09]** Chao's teachings regarding simulation are confined to a single paragraph, set forth below:

Cluster Services also supports event simulation. When Recovery Services is invoked to simulate an event, it first clones the cluster configuration database. The event simulation will be performed on the private copy of the configuration database so that the original configuration database will not be affected. During a simulation, the EXECUTE statement which actually changes the state of physical resources. (*Chao, column 14, lines 60-67*)

**[10]** While this paragraph mentions event simulation, it does not specify that the "events" include *failure events*. However, since Chao teaches that "Cluster Services supports event simulation", it is most likely that the events being simulated correspond to events defined therein.

Events defined in Cluster services include but not limited to: BRING\_COMPUTER\_UP,  
BRING\_COMPUTER\_DOWN,  
BRING\_RESOURCE\_GROUP\_ONLINE,

BRING\_RESOURCE\_GROUP\_OFFLINE, AND  
MOVE\_RESOURCE\_GROUP. (*Chao, column 13, lines 36-41*)

**[11]** As described in Chao, these Cluster-Service events appear to be actions taken to reconfigure a cluster. While they may be taken in response to a failure, these are reconfiguration events rather than failure events. Thus, it would appear that the purpose of Chao's simulator is to allow a configuration change to be planned without implementing each Cluster-service event as it is selected. Once a satisfactory reconfiguration is achieved, an EXECUTE statement can be issued to implement the reconfiguration. Note that if the event being simulated were a failure, there would be little point in executing the resulting configuration as disclosed by Chao. Thus, it appears that Chao's simulator simulates reconfiguration events and not failure events.

**[12]** Bartlett provides for simulating the response of a telephone network to failures involving the cutting of a span (a group of parallel telephone links). Bartlett does not relate to simulation of computer clusters. Even ignoring the differences between computer clusters and telephone networks, there are important abstract differences between Bartlett and the present invention. Bartlett accepts a pre-failure configuration and a failure event as inputs, but the output is a determination of whether or not the telephone system can make a full restoration or not. Bartlett does not disclose that a simulator that outputs a post-failure configuration.

**[13]** The Office Action proposes modifying Stewart's performance simulator by adding a virtual-failure event purportedly disclosed by Chao and a failure event selector of Bartlett. However, Chao does not disclose applying a virtual failure event to a simulator. In any event, Stewart's performance simulator is not adapted to

responding to a virtual failure event; also, Stewart's simulator is not disclosed to respond to any type of event by outputting a new cluster configuration.

**[14]** The Office Action asserts (citing Chao) as a motivation that the proposed combination would expand the number of nodes available for failover conditions. However, Chao does not teach that Chao's simulator affects the number of nodes available for failover conditions. Instead, Chao points to hierarchical clustering as the reason for this advantage.

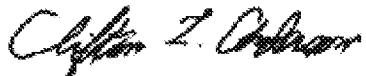
**[15]** Bartlett discloses the use of a failure event selector only in combination with a simulator that indicates whether restoration is successful or not. Bartlett does not disclose that Bartlett's failure selector would work with a performance simulator such as that disclosed by Stewart or a reconfiguration simulator such as that disclosed by Chao. In summary, the motivation for the proposed combination is lacking and the results of the proposed combination would not fall within the scope of any of the pending claims.

**[16]** New Claims 15 and 16 add limitations relating to specific types of failure events that are not disclosed in any of the references. These claims are patentable over the art of record *a fortiori* as they depend from allowable claims and in view of their non-anticipated additional limitations.

**[17] CONCLUSION**

**[18]** The rejections for obviousness are traversed as the motivation for the proposed combination is lacking and because the proposed combination does not meet the claim requirements. Accordingly, it is respectfully submitted that the application is now in condition for allowance, which allowance is respectfully requested.

Respectfully submitted,



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